



Ames Research Center

Effect of Space Flight on Innate Immunity to Respiratory Viral Infections

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Summary: This flight project will evaluate the total effects of spaceflight on the ability of the host to combat a viral pathogen. The specific aims of the project are: Aim 1. Characterize viral replication in the lung and nasal turbinates, disease severity, including airway obstruction and hyper-responsiveness (AHR), and histopathology of the airways. Aim 2. Determine the profile of IFN- α/β and innate cytokine response to viral infection in BAL and nasal tissue, as well as other proteins by 2DE gel and MALDI-TOF. Aim 3. Characterize viral replication in the lung and nasal turbinates, disease severity, & histopathology of the airways. Aim 4. Profile IFN- α/β and innate cytokine response to infection in BAL and nasal tissue

Approach: A two-phase study will be conducted: an initial phase to refine an experimental mouse in antiorthostatic suspension infected with two major human respiratory pathogens, respiratory syncytial virus (RSV) and human metapneumovirus (hMPV). The second phase : infection post-flight of mice flown on STS-133 Space Shuttle, collection of extensive clinical, virologic and immunologic data, and comparison with data collected in ground-based animal models.

Significance: Viral respiratory tract infections are among the most frequent infections in humans and such infections are nearly ubiquitous during the winter months. There appears to be evidence that these infections are increased among space travelers, making study of the immune response to these infections important. When completed, these investigations are likely to generate new critical scientific evidence of the immune pathways that are affected in antiviral host response during space flight and possible preventive or therapeutic approaches applicable to future space missions.

